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PART 2

Your attention is invited

**NEWS
OF THE
SANITARY
ENGINEERING
DIVISION
OF
ASCE**



**JOURNAL OF THE SANITARY ENGINEERING DIVISION
PROCEEDINGS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS**

RELATION
TO
VOL. 1

DIVISION ACTIVITIES

SANITARY ENGINEERING DIVISION

Proceedings of the American Society of Civil Engineers

NEWS

May, 1961

DIVISION EXECUTIVE COMMITTEE MEETING OF MARCH 19 - 20, 1961

The Executive Committee of the Sanitary Engineering Division met in Evanston, Illinois, on March 19 - 20, 1961, immediately preceding the Conference on Environmental Engineering and Metropolitan Planning held at Northwestern University on March 20 - 21, 1961. Members of the Executive Committee remained in Evanston and participated in the Conference.

Among the more important actions taken by the Executive Committee at this meeting was the adoption of a motion that a Standards Committee be formed in the Sanitary Engineering Division. The purpose of this Committee would be as follows:

"To initiate actions related to the establishment or endorsement of standards in the field of interest of the Sanitary Engineering Division and to recommend personnel for appointment to standards committees operating jointly with other divisions or other organizations."

At the request of the Secretary of the Society, three bills under action in the new Congress were reviewed. These were H. R. 152 and S. 22 dealing with saline water conversion and H. R. 924 concerning rapid tax amortization. The Executive Committee supported the basic concept of developmental research towards saline water conversion covered by S. 22 and H. R. 152. It felt, however, that research in this field to date has been in balance with need and that no expansion of the saline water conversion program is indicated at the present time. Relative to H. R. 924, the Executive Committee supported rapid tax amortization of the cost of industrial waste treatment works for the abatement of air and water pollution--such cost to be amortized at an accelerated rate for income tax purposes. Concern was expressed by the Executive Committee about the need for a firm Society policy on pending legislation regarding problems of interest to the membership. A motion was adopted recommending that the Board of Directors consider a study of ways and means for the review of proposed legislation to assure responsible engineering guidance from the Society in the interest of the public good.

On November 29, 1960, the Sanitary Engineering Division was informed

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that the National Science Foundation is financing visits by selected engineering authorities from overseas for lectures in the United States. In response to this the Chairman of the Executive Committee, John Baffa, proposed Mr. Ir. J. J. Hopmans, Director of the Rijksinstituut voor Zuivering van Afvalwater of Westeinde 3 A Voorburg, Holland. He reported that Mr. Hopmans is well known in Europe as Director of the above Institute and has been chosen to preside over a panel of the International Atomic Energy Agency in Vienna later in 1961. He said the Institute has done some excellent work in the sewage treatment field including evaluation of the Paasveer ditches and brush aerators together with research in the fundamentals of sewage treatment processes. The Executive Committee feels that a series of lectures in the United States by Mr. Hopmans on the work at the Institute in the waste water field will prove informative and stimulate thought and new research by bringing our professional people in contact with him and with descriptions of the methods of research and the results obtained. Mr. Hopmans' name has been submitted to the National Science Foundation but no commitment as to funds has been made to date. Mr. Richard Kennedy was appointed tour coordinator for Mr. Hopmans, should funds be made available.

The Executive Committee reaffirmed its previous recommendation that a coordinating committee for metropolitan area planning is needed in the Society to deal effectively with this increasingly important problem. This matter will again be called to the attention of the Division Activities Committee.

The role of the Sanitary Engineering Division in the field of industrial wastes was reassessed and the purpose of this Committee was redefined to conform with the work of other Committees of the Division and the current policy of the Society. The new statement of purpose reads as follows:

"To investigate and correlate available information regarding the practice of industrial waste treatment; to make available to the profession such information as may contribute to the improvement of such practice; to make recommendations for the improvement of such practice; and to stimulate and encourage use of competent sanitary engineering advice and guidance in this field."

Authorization will be requested for the Sanitary Engineering Division to cosponsor a proposed seminar on "Management and Conservation of the Air Resources" to be held at New York University during the coming fall. This seminar is being sponsored by the Research Council on Air Resources Engineering, which has requested financial support from the Engineering Foundation.

Authorization has been received to undertake a revision of ASCE Manual 19 entitled, "Water Treatment Plant Design," (1940). A committee is to be formed for this purpose composed of two members from the Division, two members from the American Water Works Association, and one member from the Conference of State Sanitary Engineers.

A motion was adopted to ask the Research Committee of the Division to prepare an annual report of research needs of special interest to the membership of the Division. This report is to be presented as a paper at each annual meeting of the Society.

The Public Health Activities Committee, Session Programs Committee, and the Water Supply Engineering Committee also met in Evanston during the same period. On the second day of their meeting they met jointly with the Executive Committee to discuss their program plans.

Chairman Charles Senn, Maurice Shapiro, and Emil Jensen of the Public Health Activities Committee were complimented on the way this Committee has moved ahead in its work on two problem areas assigned by the Executive Committee. A new statement of purpose for this Committee will be developed by Mr. Senn and submitted to the Executive Committee for approval.

Mr. Senn reported that the new Committee membership includes representation from Federal, State, and local governments, universities, and consulting engineering. Two meetings have already been held this year in the Los Angeles area with wide representation from persons interested in the coliform index as a measure of water quality, and the broad problem of metropolitan planning. The first meeting was devoted to the coliform index--this being preceded by a review of the literature, particularly in regard to virus. The group attending this meeting, which included virologists, recommended including recreational interests as well as water supply in the area to be studied. In reviewing data available to the Committee it was felt appropriate to report a real hazard from infectious hepatitis and definite evidence that the causative organism can survive present treatment, storage, and distribution. The coliform index was not considered indicative of virus, yet it was felt that strict adherence to present standards has not resulted in an outbreak. The Committee recommended the avoidance of marginal treatment where sewage pollution has occurred. They believe that there is need for further research and reported that the California Institute of Technology has reported studies of Hyperion plant effluent for indicators of the presence of virus. They recommended support of research in this problem area. Some discussion followed of the infectious hepatitis outbreak at Pascagoula, Mississippi, from oyster-growing beds contaminated by untreated sewage. A five-fold increase in the incidence rate of infectious hepatitis was reported in Washington and some other states.

Dr. Shapiro reported that the University of Pittsburgh has great interest in this problem. Encouraging results were recently obtained using enterococci as an indicator of sewage pollution--this organism having greater specificity than the coliform group. Mr. Berger will report on information available at the Sanitary Engineering Center in Cincinnati. Mr. Senn asked the Executive Committee for support for research in the following areas: 1. identification of public health problems which we can adequately solve, 2. systematic analysis of the individual problems, and 3. identification of those skills which can be joined with others. The opinion was expressed that the Public Health Service drinking water standards will, in effect, establish the status quo on use of the coliform organism as an indicator. He pointed out that the appendix contains considerable discussion concerning the virus problem and that the impetus is on treatment.

It was generally agreed that there is need for more work in the area of metropolitan planning. At their February 14, 1961, meeting the professional planning people pointed out how important it is to have recommendations of health agencies. Performance standards for industrial development are currently being prepared by professional planners in the Los Angeles area and they see a need for coordinated representation to assure more favorable location of industry. The Public Health Activities Committee plans to 1. spell out those things that other Committees in the Division should be looking into in the area of metropolitan planning, 2. encourage regional meetings and metropolitan planning as an activity of local sections, 3. encourage action to bring together all of the variety of groups interested in metropolitan planning.

Mr. Senn pointed to the desirability of liaison with the Planning Division on Metropolitan Area Problems and to the desirability of a coordinating committee in the Society for metropolitan planning.

Mr. Richard Kennedy represented the Session Programs Committee before the Executive Committee. He reviewed the progress of the Phoenix program, stating that it had been completed and was under the personal direction of Mr. Ben Dibble of Phoenix. As to the New York program, Mr. William Cosulich has been designated as the local representative for the Sanitary Engineering Division. Program planning for the Houston and Omaha meetings was also discussed by Mr. Kennedy. Present policy will call for four sessions of the Sanitary Engineering Division for each convention.

Chairman Robert Mitchell, Mr. Paul Haney, and Mr. Gerald Arnold represented the Water Supply Engineering Committee in its meeting with the Executive Committee. Mr. Mitchell said the Committee has studied the Eastman report and generally recommends that it serve as a basis for its work in water quality. Mr. Mitchell felt that the creation of another task committee on water quality might not be as effective as the assignment of specific sections of the study of persons working in the fields concerned and possessing exceptional qualifications and interest in those areas. He proposed to title the overall study "Major Water Quality Problems of the United States." Papers will be invited about a year in advance of expected completion for presentation at conventions. It was generally agreed that the first series of papers would be survey reports followed by detailed studies and papers at a later date. The survey reports will emphasize the magnitude and extent of water quality problems and the overall impact on the economics and life of each area in the country. Subject matter will be directed towards the effect on water quality of all recognized uses of all major categories of industrial and municipal wastes.

DID YOU KNOW THAT

Dr. Joseph Malina has been appointed Assistant Professor of Sanitary Engineering at the University of Texas. Dr. Malina did his undergraduate work at Manhattan College and received his Ph. D. degree from the University of Wisconsin.

Michael M. Gallup, an engineer of 38 years' experience with sewers and other construction, has been appointed Chief of Engineering of the Metropolitan Sewer District of St. Louis, Missouri.

Edward J. A. Gain, Chief of the Engineering-Design Department of the Metropolitan Sewer District of St. Louis, has been promoted to the newly-created office of Technical Assistant to the Executive Director.

Secretary of the Interior Stewart L. Udall announced selection of Charles Frederic MacGowan of Kansas City, Kansas, to be director of the Office of Saline Water, Department of the Interior.

Mr. Clarence Magnussen, formerly Senior Engineer with the City of Los Angeles Department of Public Works, joined the Engineering-Science, Inc. staff to head up sewerage design projects. Another new member of the staff is Murray Cooper, a public health and sanitarian specialist formerly with the City of Ontario, California Health Department.

CONFERENCE ON ENVIRONMENTAL ENGINEERING AND METROPOLITAN PLANNING

On March 21 - 22, 1961, a conference on Environmental Engineering and Metropolitan Planning was held at the Technological Institute of Northwestern University in Evanston, Illinois. The Conference was sponsored by the North-eastern Illinois Metropolitan Area Planning Commision, the Technological Institute, Northwestern University, the U. S. Public Health Service, and the City Planning and Sanitary Engineering Divisions of ASCE.

The stated objectives of the conference were:

1. To define the engineering parameters of the metropolitan area problem, and to clarify the interrelationships between planning and civil engineering.
2. To protect and crystallize those planning principles bearing on the environmental engineering aspects of metropolitan area development.
3. To alert city planners, public health specialists, legislators and public officials generally, as well as civil engineers, to the increasing seriousness of the environmental engineering aspects of metropolitan growth, and to the pressing need for advance planning including the reservation of land for future needs in relation to recreation, water supply, flood control, waste disposal, etc.
4. To establish a better understanding among city planners concerning the role of civil engineering in the expansion of metropolitan areas.
5. To establish a better understanding among civil engineers of the need for correlating engineering activity with over-all planning goals and concepts.
6. To exchange ideas and pool the experience of different professional groups working in different metropolitan areas in regard to the problems of environmental engineering.
7. In general, to encourage a more unified approach to urban problems, to foster better liaison among leading professionals concerned with the problems of environmental engineering in metropolitan areas, to build mutual respect and understanding and to establish closer personal relations.

In his paper, "Environmental Health Criteria for Metropolitan Areas," H. M. Bosch, Professor of Public Health, University of Minesota listed the following areas in which criteria are needed in relation to this subject:

1. Water supplies with reference to their adequacy and to their biological, physical and chemical quality.
2. Liquid waste disposal systems with reference to their adequacy and safety and with consideration of safe reuse of the treated liquid wastes.
3. Solid waste disposal with reference to adequacy and safety and with consideration of maximum economic utilization of by-products from such disposal systems.
4. Ionizing radiation including the storage and disposal of radioactive wastes.
5. Housing not only with the purpose of controlling of transmission of infectious diseases but also with consideration of designs which provide for privacy and maintain human dignity and of factors such as noise, ventilation, temperature, lighting and accident prevention.
6. Food supplied including milk.
7. Control of arthropods, rodents, and molluscs not only those involved in human disease but also those whose only known effect is a nuisance one.
8. Control of domestic pets to prevent the transmission of disease to humans.

9. Control of external atmospheric pollution.
10. Control of the atmosphere within factories, schools, hospitals, and homes.
11. Safety measures to minimize the risk to health (as broadly defined) because of biological, chemical or mechanical stresses.

In his paper, "Planning Criteria for Metropolitan Areas," Dennis O' Harrow, Executive Director, American Society of Planning Officials, listed the following criteria which must be considered in metropolitan planning.

"First identify the essence of a metropolitan area - a community of persons living under a diversity of governments.

"Second, assure yourself that there are metropolitan problems, problems that overlap the jurisdictional areas of several governments.

"Third, after you have decided to form a metropolitan planning agency, do your utmost to build up an understanding of and respect for planning by giving all possible assistance to a build-up of local planning.

"Fourth, work out a rational metropolitan plan, always remembering that the essence of planning is the coordination of all aspects of area development and the best possible reconciliation of regional and local needs and goals.

"Fifth, make the plan practical and possible by knowing the complete financial problem and by exerting every effort to improve a situation that is universally complicated and messy.

"Sixth, consciously work for metropolitan citizenship and the development of metropolitan leaders, because these and only these can make and carry out metropolitan decisions."

Under the general topic, "Environmental Problems," several papers were presented concerning the problems of water supply, sewerage disposal, and various waste disposal problems. Mr. Gordon McCallum, Chief, Division of Water Supply and Pollution Control, PHS, Washington, D. C., presented a paper on "The Surface Water Supply Problem" in which he outlined several programs that are being conducted by the Public Health Service. In regard to comprehensive basin-wide planning Mr. McCallum stated, ". . . we regard comprehensive programming as the most important of all authorities delegated in the Act (P. L. 680). All other activities support and point up comprehensive program development.

"It recognizes the river basin as the logical unit for water resource development. It is an endeavor on the part of all the communities and industries in the basin, and municipal, State and Federal governments to cooperate in developing and carrying out a plan so that the water resource can be used continuously without being degraded. It means calculating all withdrawal uses, land uses, runoff, etc., present and future. Plans must remain flexible and subject to change as conditions in the basin change."

Mr. McCallum asserted that Pollution Control was probably the most effective way to increase the supply of usable water supply. He summed up his remarks with the following:

"In the final analysis, however, water quality can best be effected by the prevention and control of pollution. More 'new' water can be provided to meet needs by controlling pollution than by any other feasible means. Pollution control has the advantage of permitting the use of an already available distribution system, the natural waterways of the country, to deliver water of satisfactory quality to the points where it is needed.

"As metropolitan areas continue to grow, their water needs will increase. Future water demands can best be met by keeping our streams and rivers clean so the same waters can be used over and over. Thus, if each metropolitan area properly treats its wastes, it will in essence--indeed, in fact--be assuring its own water supply."

Mr. W. C. Ackermann, Chief, State Water Survey, Illinois, presented a paper entitled "The Ground Water Supply Problem" in which he discussed the effects of urbanization upon the quality of ground water. His remarks were prefaced with the assertion that, at present, there is still a tremendous amount of lack of knowledge concerning ground water. He noted that this situation was basic but was amenable to solution. This would involve an accelerated program of geologic mapping and interpretation along with hydrologic and chemical evaluation. And, secondly, these action programs need to be supported by research to improve and speed methods.

Mr. Ackermann noted that many man-made pollutants are now finding their way to productive underground water-bearing formations. Among those listed were: salt-water intrusion due to overpumping, the presence of detergents in wells, improperly designed lagoons for sewage and industrial waste disposal, the use of abandoned mines or fissured limestone areas for sewage and waste disposal, and spillages and radioactive wastes.

Mr. Ackermann summed up his talk with the following comments:

"In summary, the harvest of quality degradation of our underground waters may come more slowly than the pollution of surface waters. But the ground is no rug under which we can sweep our waste products. The resultant pollution may be delayed in appearing, but once present, it is not swept away with the first flood tide. Underground pollution is tenacious and not easily removed. It can pollute otherwise useful water resources and is insidious because it is not as obvious, and may go undetected."

Mr. A. L. Tholin, Engineer of Public Works, Chicago, presented a paper entitled, "The Sewerage and Drainage Problem" in which he outlined the problems of storm and sewage water collection and drainage.

His conclusions were:

1. Convey spent water supply quickly by underground conduits to place of treatment and disposal.
2. Avoid combined sewers, if possible. Take a look at what they spill, and where.
3. Detain stormwater at origin, where possible, next in the neighborhood, or, finally, in the valleys--but for the good of our pocketbook and our downstream neighbor, hold all we can, as long as we can.
4. Interpret river gagings with a quizzical eye. Estimate effect of urbanization.
5. Find out what flow-ways we need--establish them--maintain them. If we can't afford to clear them all at once, try floodproofing, and brace ourselves against damage.
6. Have a master plan.

Mr. C. A. Rogus, Director of Engineering, Department of Sanitation, New York, presented a paper on "The Solid Waste Problem" in which he discussed the problems associated with refuse disposal. Mr. Rogus quoted the staggering figures that our population of 180 million produces over 110 million tons or about 600 million cubic yards of refuse each year.

Mr. Rogus went on to define the word "refuse" pointing out the quantities and composition of refuse in a metropolitan area. He then outlined various methods of collection, pointing out the frequency, point of pickup, type of collection vehicles, etc. He also described several refuse disposal methods including piggeries, grinding, incineration, composting, and sanitary landfill.

Mr. Rogus summed up his paper with the following four points:

1. Proper refuse collection, refuse disposal and adequate street cleaning are

essential to the urbanized community's health and welfare and can be cheaper in the long run than ill-advised neglect.

2. Because of its size and complexity, today's solid waste problem requires sound planning and good management to secure effective and efficient solutions.

3. In the face of the ever-rising labor costs and because of the size of the solid waste problem, efficient solutions call for mechanization and use of engineering talents.

4. The trend toward urbanization and formation of the megalopolis emphasizes the need for conserving available lands for long-range solid waste disposal. "The Air Pollution Problem," a paper presented by Mr. John A. Maga, Chief, Bureau of Air Sanitation, California State Department of Public Health, dealt with the problems associated with air pollution in the metropolitan area. Mr. Maga stressed the effects of air pollution which are varied and widespread and are felt by man, animals, plants and inanimate objects. They can be aesthetic, biological and physical and can result in direct economic loss or indirect or intangible losses. He also pointed out that the range of these effects can vary from discomfort and destruction of the enjoyment of living to the occurrence of death while between these extremes there may be interference with performance of tasks, chronic disease or acute illness.

Mr. Maga pointed out the relationship between the rise of air pollution and the increased combustion of fuels and also the increased use of motor vehicles. He explained that among the requirements needed to better attack the air pollution problem are increased research into the effects of air-borne pollutants and into meteorological processes.

Mr. Maga concluded that in some parts of the country with particularly limited air dilution, the most efficient controls may not be adequate to maintain satisfactory air quality with unrestricted growth. There will have to be an acceptance of the idea that a plan for the development of the metropolitan region should take into account the air pollutants that will be emitted into the atmosphere. It is important that this planning be on a regional basis. It should go beyond performance standards and zoning and consider the dilution capacity of the atmosphere in order to prevent high concentration of pollutants, both in the immediate source as well as throughout the entire region. Such planning may prevent the location of certain sources in one area and limit the number in another; it may restrict automobile use and provide mass transit systems to keep emissions at a safe level in the atmosphere.

Other papers presented at the conference dealt with the methods of governmental action to implement the recommendations made in the foregoing technical papers. The various technical groups held workshop sessions to prepare recommendations for the whole group to act upon. The Recommendations of this Conference will be published in a later issue of the "Newsletter."

THOMAS R. GLENN, JR., APPOINTED EXECUTIVE SECRETARY, ASEIB

The American Sanitary Engineering Intersociety Board has announced the appointment of Thomas R. Glenn, Jr., as Executive Secretary and transfer of the office of the Board to 117 Benner St., Highland Park, N. J. All communications with the Board or the American Academy of Sanitary Engineers should be addressed to Mr. Glenn at Post Office Box 143, Highland Park, N. J.

Mr. Glenn brings a wealth of sanitary engineering background to this voluntary activity. He received a B.S. degree in Chemical Engineering from the

University of Texas and an M. S. degree in Sanitary Sciences from New York University. Since 1957 he has been associated with the Interstate Sanitation Commission, 10 Columbus Circle, New York City, where he is now Director and Chief Engineer. He taught sanitary engineering at Rutgers University for more than 10 years prior to joining the Interstate Sanitation Commission. During World War II he was on the teaching staff of the U. S. Naval Academy, Annapolis, after which he spent 2 years on sea duty. He has been consultant on many sanitary engineering projects.

He is a registered professional engineer. In addition to being a Diplomate of the American Academy of Sanitary Engineers, he is a member of the American Society of Civil Engineers and a member of the American Public Health Association, the Water Pollution Control Federation and the N. J. Water Pollution Control Association.

PHS ANNOUNCES PUBLICATION OF A COMMUNITY ENVIRONMENTAL HEALTH PLANNING GUIDE

Recognizing the need of many communities for the proper planning of adequate environmental health programs for their expanding urban population, the PHS has published an Environmental Health Planning Guide. This guide has been designed to assist in evaluating health related services and facilities from a planning standpoint. The guide includes discussions on the collection and use of data on sanitation services, health agency operations, sewerage, water, refuse collection and disposal, air pollution and housing. Also included is a typical report form and maps.

Although designed for use by official and non-official, professional and lay community groups, the PHS recommends that assistance in using the guide be obtained from public health and other local agencies. A limited number of copies of the publication (PHS No. 823), are available without cost for use by study groups. They may be obtained from any of the PHS regional offices.

SANITARY ENGINEERING EDUCATION

RESEARCH TRAINEESHIPS AVAILABLE

Northwestern University has announced a number of research traineeships and fellowships in the field of sanitary engineering and environmental health. These are available for M. S. and Ph. D. degree candidates with research interest in air pollution, biological engineering, water resources planning, operations research and water and sewage treatment. Stipends range from \$1800 per year to \$3600 per year. Write: Dr. John A. Logan, Department of Civil Engineering, Northwestern Technological Institute, Evanston, Illinois.

PHS AWARDS GRANTS FOR GRADUATE TRAINING

The Public Health Service announced the award of 35 project grants for graduate training in public health totaling \$824,600. These grants were awarded to 24 schools in 15 States and Puerto Rico. This is the second group of applications to be approved under legislation enacted by Congress August 1960.

Purpose of these grants is to strengthen or expand graduate public health training in schools of public health and in those schools of nursing and engineering that provide graduate or specialized training in public health. Special

emphasis is placed on improving curricula to meet the needs of changing and emerging public health programs, strengthening courses of basic training in public health administration, developing and demonstrating improved training methods and procedures, and enlarging faculties and staff to provide for increased enrollment.

Among the approved applications are training projects concerned with metropolitan planning, public health administration, international health, air hygiene and pollution, and waste disposal.

<u>STATE AND INSTITUTION</u>	<u>TITLE</u>	<u>AMOUNT</u>
Stanford University Department Civil Engineering	Water Resources	32,360
University of Illinois Department Civil Engineering	Air Pollution	16,632
Northwestern University Department Civil Engineering	Sanitary Chemistry	11,496
Northwestern University Department Civil Engineering	Metropolitan Planning	20,110
State University of Iowa Department of Sanitary Engineering	Waste Treatment Methods	16,000
University of Michigan Department of Civil Engineering	Sanitary Engineering	32,497
University of Minnesota Civil Engineering Department	Water Resources	13,675
Polytechnic Institute of Brooklyn Department of Civil Engineering	Sanitary Engineering	21,700
University of North Carolina School of Public Health	Air Hygiene and Pollution	16,308
University of Oklahoma College of Engineering	Sanitary Chemistry	21,600
Rice University Civil Engineering Department	Sanitary Engineering	22,032
Washington State University Department Civil Engineering	Sanitary Science	9,952
University of Wisconsin Department of Civil Engineering	Waste Disposal	12,528
University of Wisconsin Department of Civil Engineering	Air Pollution	16,362

RESEARCH TRAINING GRANTS AWARDED

The National Institutes of Health, the Public Health Service research center at Bethesda, Maryland, recently announced the award of 118 grants, totaling \$5,586,246, to support the training of research scientists in basic medical and health-related sciences.

The grants, made through the Division of General Medical Sciences at the National Institutes of Health, were awarded to 89 institutions and universities in 33 states, the District of Columbia, Canada, and Sweden.

These awards are part of an NIH effort to help meet requirements for trained scientific manpower in fields basic to medicine and health. The grants provide support for the training of graduate students and postdoctoral trainees in the following fields: physiology, anatomical sciences, biochemistry, genetics, pharmacology, microbiology, developmental biology, pathology, comparative physiology, epidemiology and biometry, biomathematics, and biomedical engineering.

Awards of interest to environmental health personnel are listed below.

California Institute Technology Pasadena, California Dr. J. E. McKee	\$60,750	Training Program in Environmental Health Engineering
University of Florida Gainesville, Florida Dr. John E. Kiker, Jr.	\$39,000	Training Program in Sanitary Engineering
Northwestern University Evanston, Illinois Dr. John A. Logan	\$40,824	Training Program in Sanitary & Environmental Health Engineering
The Johns Hopkins University Baltimore, Maryland Dr. Charles E. Renn	\$64,800	Training Program in Environmental Health Engineering
Harvard University School of Public Health Boston, Massachusetts Dr. Leslie Silverman	\$52,500	Training Program in Environmental Hygiene
University of Minnesota Minneapolis, Minnesota Dr. George Schroepfer	\$38,475	Training Program in Sanitary Engineering
Washington University St. Louis, Missouri Dr. D. W. Ryckman	\$68,040	Training Program in Sanitary & Public Health Engineering & Sciences
Rutgers University New Brunswick, New Jersey Dr. Hovhaness Heukeleian	\$40,920	Training Program in Air & Water Sanitation
New York University Medical Center New York, New York Dr. Norton Nelson	\$69,984	Training Program in Environmental Health
University of Rochester Rochester, New York Dr. Daniel W. Healy, Jr.	\$54,407	Training Program in Biomedical Engineering
University of North Carolina School of Public Health Chapel Hill, North Carolina Dr. Daniel A. Okun	\$52,500	Training Program in Sanitary Science & Engineering

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University of Pennsylvania
Philadelphia, Pennsylvania
Dr. Herman P. Schwan

\$45,000

Training Program in Biomedical
Engineering

ELEVENTH ANNUAL FIELD TRAINING INSTITUTE AT OKLAHOMA
UNIVERSITY

The Oklahoma State Health Department and the University of Oklahoma will jointly sponsor field training for American and International public health workers at a Summer Field Training Institute for Engineers and Sanitarians to be held at Norman, Oklahoma, June 5 to July 28, 1961.

The University of Oklahoma Department of Sanitary Science and Public Health will offer, to qualified students, 1 to 8 hours credit in Course 250, Public Health Practices (graduate or undergraduate), for satisfactory completion of this training course. Students enrolling for credit will be required to pay the regular tuition. No fees are required for other students taking the field training.

The purpose of this field training is to provide students with a practical field training through a "learn-by-doing" technique, and to give them a broad acquaintance with public health practice.

Each of the eight weeks will consist of supervised field work and laboratory practice, together with group discussions on the field work. In general, the procedure will be to discuss briefly the basic public health aspects, principles, and practices of each phase of local health sanitation, with major attention being devoted to sanitation problems. These problems will then be carried out, insofar as possible, as an integral part of the regular sanitation program of the area. Further information may be obtained from: George W. Reid, Coordinator, Department of Sanitary Science and Public Health, University of Oklahoma, Norman, Oklahoma.

PHS ANNOUNCES F.Y. 1962 TRAINING COURSES

The following schedule lists the complete roster, in chronological arrangement, of short-term, technical courses presented by the Divisions of Occupation Health, Radiological Health, Engineering Services, Air Pollution, and Water Supply and Pollution Control for Fiscal Year 1962 (July 1, 1961 - June 30, 1962). The facility or laboratory where each course is given is indicated by the following code:

DOH — Occupational Health Research and Training Facility, Cincinnati, Ohio

SEC — Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio

Rock — Radiological Health Laboratory, Rockville, Maryland

Mont — Southeastern Radiological Health Laboratory, Montgomery, Alabama

Vegas — Southwestern Radiological Health Laboratory, Las Vegas, Nevada

July 10 - 21, 1961

Advanced Training for Engineers
and Scientists from Foreign
Countries (47S) - SEC

October 9 - 20, 1961

Industrial Hygiene Chemistry
(102 O) - DOH

July 10 - September 8, 1961

Engineering Aspects of Radio-
logical Health (94 R) - SEC

October 16 - 27, 1961

Plankton Identification and
Control (19 W) - SEC

July 24 - 28, 1961	Recent Developments in Water Bacteriology (4 W) - SEC	October 23 - 27, 1961	Ion-Exchange Techniques for Fluorides and Mercury (103 O) - DOH
September 11 - 22, 1961	Basic Radiological Health (6 R) - Vegas	October 23 - November 3, 1961	Control of Particulate and Gaseous Pollutants (85 A) - SEC
September 12 - 14, 1961	Milk Pasteurization Controls and Tests (95 M) - SEC	October 23 - November 3, 1961	Occupational Radiation Protection (15 R) - SEC
September 20 - 22, 1961	Sampling and Identification of Aero-Allergens (86 A) - SEC	October 23 - November 3, 1961	Basic Radiological Health (6 R) - Rock
September 25 - 29, 1961	Engineering Management of Nuclear Emergencies (83 R) - Vegas	November 6 - 10, 1961	Radioactive Pollutants in Water (20 WR) - SEC
October 2 - 13, 1961	Community Air Pollution (53 A) - SEC	November 6 - 10, 1961	Medical X-ray Protection (61 R) - Rock
October 9 - 13, 1961	Determination of Antibiotic and Pesticide Residues in Dairy Products (72 M) - SEC	November 13 - 17, 1961	Radionuclides in Water (65 WR) - SEC
October 9 - 20, 1961	Basic Radiological Health (6 R) - SEC	November 28 - 30, 1961	Training for Occupational Health Nurse Consultants (104 O) - DOH
October 9 - 20, 1961	Industrial Hygiene Engineering (101 O) - DOH	December 4 - 15, 1961	Chemical Analyses for Water Quality (3 W) - SEC
December 11 - 15, 1961	Medical and Biological Aspects of Air Pollution (68 A) - SEC	February 12 - 16, 1962	Laboratory Examination of Milk (2 M) - SEC
January 8 - 19, 1962	Medical Aspects of Radiological Health (50 R) - Rock	February 19 - 23, 1962	Laboratory Examination of Foods (9 M) - SEC
January 8 - 19, 1962	Industrial Hygiene Engineering (101 O) - DOH	February 26 - March 9, 1962	Water Quality Management (1 W) - SEC
January 8 - 19, 1962	Industrial Hygiene Chemistry (102 O) - DOH	February 26 - March 9, 1962	Basic Radiological Health (6 R) - Vegas
January 15 - 26, 1962	Basic Radiological Health (6 R) - SEC	March 5 - 9, 1962	Analysis of Atmospheric Inorganics (54 A) - SEC
January 22 - February 2, 1962	Bio-Oxidation of Industrial Wastes (73 W) - SEC	March 12 - 16, 1962	Methods and Practices for State Milk Laboratory Survey Officers (70 M) - SEC

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January 22 - February 2, 1962
Microscopic Analysis of
(71 A) - SEC

January 29 - February 2, 1962
Radioactive Pollutants in Air
(39 AR) - SEC

February 5 - 9, 1962
Recent Developments in Water
Bacteriology (4 W) - SEC

February 5 - 9, 1962
Radioactive Pollutants in Water
(20 WR) - SEC

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Radionuclides in Water
(65 WR) - SEC

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Shellfish Sanitation
(44 M) - SEC

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Water (20 WR) - Mont

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(53 A) - SEC

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Basic Radiological Health
(6 R) - SEC

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Organic Industrial Wastes
Characterization (57 W) - SEC

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(101 O) - DOH

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Industrial Hygiene Chemistry
(102 O) - DOH

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Inorganic Industrial Wastes
Characterization (10 W) - SEC

May 7 - 11, 1962
Heat Stress and Its Control
(105 O) - DOH

May 7 - 16, 1962
Reactor Safety and Hazards
Evaluation (36 R) - SEC

March 12 - 23, 1962
Analysis of Atmospheric
Organics (55 A) - SEC

March 12 - 23, 1962
Sanitary Engineering Aspects of
Nuclear Energy (35 R) - SEC

March 19 - 23, 1962
Radiological Health for Nurses
(78 R) - Rock

April 2 - 6, 1962
Meteorological Aspects of Air
Pollution (90 A) - SEC

April 9 - 13, 1962
Fundamentals of Data Processing
(97 S) - SEC

May 7 - 18, 1962
Basic Radiological Health
(6 R) - Rock

May 14 - 25, 1962
Radionuclides in Foods
(59 MR) - SEC

May 14 - 25, 1962
Atmospheric Survey
(84 A) - SEC

May 21 - 25, 1962
Medical X-ray Protection
(61 R) - Rock

May 28 - June 1, 1962
Source Sampling for Atmospheric
Pollutants (89 A) - SEC

June 4 - 15, 1962
Advanced Training for Sanitary
Engineering Reserve Officers -
SEC Course One
Course Two
Course Three
(Titles to be announced later)

June 11 - 15, 1962
Medical Management of Nuclear
Emergencies (92 R) - Vegas

June 18 - 29, 1962
Aquatic Biology for Engineers
(12 W) - SEC

May 7 - 18, 1962

Solvent Analysis Techniques
(106 O) - DOH

WATER SUPPLY & POLLUTION CONTROL

CONFERENCE OF STATE SANITARY ENGINEERS ISSUES "REPORT ON MUNICIPAL WASTE TREATMENT NEEDS."

The results of a comprehensive State-by-State survey of municipal waste treatment needs which was begun last fall by the Conference's Committee on Sewage and Waste Disposal are the subject of a recent report. Data forms were collected from 48 States, the District of Columbia, Puerto Rico, and the Virgin Islands. These forms listed all communities requiring new sewage treatment plants, expansion of existing plants, or additional treatment as of December 31, 1960.

The survey disclosed that 5127 communities serving 42 million people require new sewage treatment plants, plant enlargements, or additional treatment. These requirements are broken down as follows:

	Number of Communities	Population Served
New Plants	4,136	22,997,547
Enlargements	560	12,729,981
Additional Treatment	431	6,513,197
Total	5,127	42,240,725

The cost of all municipal waste treatment needs was estimated at two billion dollars. The elimination of this backlog in ten years together with needs imposed by population growth and obsolescence of existing works will require an average annual expenditure of \$600 million.

Most States reported a rather large backlog of treatment needs for communities still discharging untreated or inadequately treated wastes with new plant construction needs accounting for nearly 70 percent of the total backlog cost. Although a substantial majority of new plants needs are for communities of less than 10,000 population the cost of providing new facilities for larger cities is approximately the same for both groups.

For the first time the number of unsewered towns requiring new sewer systems and treatment plants were reported. These amounted to some 1,999 communities with a total population of 3,074,424.

Cost data for the needs reported are tabulated by Population Size Group and by States with further breakdown of costs given for new plants, additions and enlargements.

The national summary of the cost data is as follows:

	Cost
New Plants	\$ 758,900,000
Enlargements	211,600,000
Additions	122,300,000
Sub-total	<u>1,092,800,000</u>
Ancillary Works	921,600,000
Total	<u>\$ 2,014,400,000</u>

BUCKS COUNTY, PA. DEVELOPS MASTER WATER PLAN

Dr. Charles L. Wilbar, Pennsylvania State Health Secretary, recently cited Bucks County for being the first county in the state to develop a master plan for present and future sewerage and water needs.

The plan calls for reservoirs, water supply treatment plants and distribution systems and sewers and sewage treatment plants that planners feel will be needed by 1965, 1980 and 2010. Projected future populations, estimated construction costs and possible financing methods are included.

The plan was prepared for the Bucks County Planning Commission, in collaboration with the Bucks County Department of Health, by Albright & Friel, Inc., consulting engineers of Philadelphia. The State Health Department aided in preparation of the report, and its regional sanitary engineer (George A. Elias, of Philadelphia) served as a member of the Technical Advisory Committee.

The plan report emphasizes that "planning and construction of water supply and sewage facilities in Bucks County has lagged far behind the rapid rates of residential, industrial, commercial and school construction." Bucks County's present 197,000 population is expected to more than double by 1980 and by the year 2010 (it is estimated) will reach 670,000.

PHS ISSUES WATER FACILITY INVENTORY

The Public Health Service announced recently the first four volumes of an inventory of water facilities for the approximately 20,000 United States communities of more than 100 population.

The last similar inventory was in 1947-8. For the first time the new compilation will include names of communities that do not have any public water supply.

The new inventory discloses information about ownership of the water facility, age of equipment, type of laboratory control, number of meters, source of supply and safe yield of water, and types of water treatment--aeration, chemical, mixing device, etc.

The complete set of nine volumes will be issued during the next few months in a series corresponding to the nine regions of the Department of Health, Education and Welfare. Statistical analysis of the data is now under way and results will be available at about the same time the basic documents are released.

The volumes now available include the following states:

Region III: District of Columbia, Kentucky, Maryland, North Carolina, Virginia, West Virginia, Puerto Rico, Virgin Islands.

Region IV: Alabama, Florida, Georgia, Mississippi, South Carolina, Tennessee.

Region VI: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota.

Region VIII: Colorado, Idaho, Montana, Utah, Wyoming.

INCOPOT CHANGES ASKED

The Pennsylvania State Legislature has been asked to approve changes in the Interstate Potomac River Commission compact. These changes would increase the authority and efficiency of the commission to coordinate the control

of water pollution. Pennsylvania is one of the four member states (Maryland, Virginia and West Virginia are included) that, with the U.S. Government and the District of Columbia, make up the Interstate Commission on the Potomac River Basin.

House Bill 388 seeks State endorsement of proposed revisions in the Commission compact that would enable the Commission to deal with all types of use and conservation of water and associated land resources in the Potomac basin. Under the proposal, the Commission could broaden its research and informational services to include all water problems, rather than pollution alone. In addition, the Commission could set stream quality standards and classify the river and its tributaries as to present and proposed uses. Other proposed changes would remove the present \$30,000 limit on annual appropriations by member states for Commission operating expenses and would permit setting up of sectional groups within the Commission to deal with water problems not affecting all members.

**TWO NEW OFFICE OF SALINE WATER RESEARCH AND DEVELOPMENT
PROGRESS REPORTS NOW AVAILABLE TO PUBLIC**

Two new technical reports of the Office of Saline Water have been published and are for sale by the Department of Commerce. The reports are: "Demineralization of Saline Water by Electrically-Induced Adsorption on Porous Graphite Electrodes," and "Corrosion of Metals in Sea Water."

"Demineralization of Saline Water by Electrically-Induced Adsorption on Porous Graphite Electrodes," is a report of experimental work conducted by the University of Oklahoma Research Institute under contract with the Department of the Interior's Office of Saline Water.

The feasibility of water demineralization by adsorption of ions on pairs of finely-divided graphite electrodes bearing an applied electrical potential difference was previously demonstrated. This process involved the transfer of dissolved salt from cathode to anode across an anion-selective membrane. Later, both cation-responsive and anion-responsive electrodes were developed by chemical treatment of various forms of graphite. In cells utilizing these newly developed electrodes, a membrane was no longer required.

Some of the research accomplishments resulting from this study and detailed in the report are: New methods for improving the capacity of cation-responsive graphite electrodes; improved electrode characteristics through refinement of dispersion techniques; a new demineralization cell to improve the efficiency of the process was constructed; and preliminary cost estimates for demineralization of brackish waters and sea water using graphite electrodes were prepared. These estimates indicate the economic feasibility of the process, which was conservatively estimated to be of comparable or lesser expense than competing methods, notably electrodialysis with ion exchange resins.

"Corrosion of Metals in Sea Water," has been prepared for the Office of Saline Water by the Battelle Memorial Institute of Columbus, Ohio.

The increased activity in the utilization of sea water involves the use of a variety of equipment and focuses attention on the need for knowledge of the behavior of metals and other materials in marine service.

Before choosing metals or other materials of construction for distillation plants handling sea water, many factors have to be considered, including the initial cost of materials, the efficiency of the materials in the intended design,

the lifetime of these materials as influences by corrosion and by other factors.

This report is concerned primarily with the corrosion behavior of metals and other materials in sea water, in diluted sea water, and in brackish waters. Corrosion and scaling problems as a result of heating saline waters are given particular attention. Information presented in the report was obtained from (1) a review of pertinent corrosion literature, (2) consultations with experts in the field of corrosion, (3) reports of marine corrosion research, presented at meetings of the Sea Horse Institute (directed by the International Nickel Company) at Wrightsville Beach, North Carolina, (4) manufacturers' technical publications, and (5) Battelle's own marine experience.

Copies of "Demineralization of Saline Water by Electrically-Induced Adsorption on Porous Graphite Electrodes" is \$1.75. To order this report from the Department of Commerce specify order number PB 171129.

To obtain "Corrosion of Metals in Sea Water" from the Department of Commerce specify order number PB 171344. The price is \$1.75.

LAWRENCE EXPERIMENT STATION RECEIVES GRANTS

Additional grants totalling approximately \$130,000 have been received and allocated for various research projects by the Massachusetts Health Research Institute, Inc., Dr. Alfred L. Frechette, President, reported to the Board of Directors.

The Institute, now in its second year, is a non-profit corporation founded for the purpose of conducting and financing research studies into the causes, nature, treatment of disease, disorders and environmental conditions of particular importance to public health.

According to Dr. Frechette grants received by the Institute have been allocated for research studies in cancer, water purification, sewage treatment, and encephalitis. The studies will be carried on at Pondville Hospital, Lemuel Shattuck Hospital, Lawrence Experiment Station, and the Institute of Laboratories.

Grants were received from the New England Water Pollution Control Commission, American Cancer Society (Massachusetts Division), United States Public Health Service, Medical Foundation, and Laurence Rockefeller of the philanthropic Rockefeller family. Plans are almost complete for the start of a research project, "Removal of Iron and Manganese from Ground Water," under a grant from Johns Manville. The study will be conducted at the Lawrence Experiment Station.

PHS AWARDS FIRST ADVANCED SEWAGE TREATMENT CONTRACT

Dr. Luther L. Terry, Surgeon General of the Public Health Service, recently announced award of a contract to Dow Chemical Company's Industrial Service Division, Cleveland, Ohio, to study physical and chemical techniques of removing residual materials in sewage treatment plant effluents.

The \$25,200 contract will support studies to determine efficiency of specially-prepared activated carbons to remove these contaminants. The method is used by water utilities to treat raw water but has not been applied to sewage treatment processes.

The contract is the first in a series to university and industrial laboratories to study new and unconventional sewage treatment methods. These contracts will form the core of a new advanced sewage treatment program of the

Service's Division of Water Supply and Pollution Control.

In addition to the Dow contract, six others are under consideration, awaiting resolution of patent technicalities and further contract negotiations. Among methods to be investigated are separation of impurities by foam fractionation, freezing, gas hydration, adsorption, and other advances scientific processes.

NORTHWESTERN STUDIES COST-BENEFIT RATIO OF PUBLIC HEALTH

Northwestern University is studying "The Quantitative Relationship between Municipal Water Supplies and Economic Development," sponsored by the International Cooperation Administration with a grant of \$31,000. The objective of the project is to determine quantitatively a cost-benefit ratio between the increase in economic output and the costs of obtaining such an increase for each area studied.

ICA wishes to establish this cost-benefit ratio to compete for available funds with other public works expenditures for which cost-benefit ratios have already been determined.

On-the-spot investigations have been made in Puerto Rico and in the Albuquerque Standard Metropolitan Area of New Mexico. From the data collected in these areas and from an extensive literature survey, the team is working to quantify the cost-benefit ratio by (1) evaluating the change in the level of public health due to the reduction in mortality and morbidity due to water-borne diseases, (2) determining the changes in the labor market, both in terms of workers available for productive work and through increased work capacities and (3) ascertaining the possible expansion and relocation of industry due to the development of municipal water supplies in that area.

AIR POLLUTION

SUBJECTS FOR RESEARCH DETERMINED BY AIR RESOURCES COUNCIL

Continuous concern over health effects of atmospheric pollutants, as well as the economic loss involved, has spurred the efforts of the newly organized Research Council on Air Resources Engineering. The Council has announced general categories of studies to be undertaken.

These include:

- Health effects of atmospheric pollutants;
- Urban growth patterns as affected by atmospheric pollutants;
- Processes to abate or counteract pollutants;
- Instrumentation for analyzing the atmosphere and its pollutants;
- Incineration pollutants;
- Micro-meterology, agricultural air management and closed ecology.

The Council considered inclusion of studies of gasoline engine exhaust pollutants, but recognized that extensive work in this area has been completed, or is underway.

The Research Council on Air Resources Engineering was formed by action of the ASCE Board, upon the urging of the Sanitary Engineering Division. Object of the coordinating effort is "to advance engineering knowledge and practice through stimulating and guiding research and assisting the financing thereof in the field of air pollution control; to organize research projects; in

cooperation with professional committees, to interpret the findings of such research; and, to make available information and recommendations resulting from such research."

In its organization stages, the Council cited direct cost of polluted atmosphere in the U.S., which runs to at least \$10 per capita per year. In some metropolitan areas, where the soot, ash and dust fall are uncontrolled, these costs are much higher. One of the early projects will be the determination of such costs with greater accuracy, pointing up specific areas for early abatement methods.

Elected to offices in the control group of the Council were William T. Ingram, Chairman, Albert F. Bush, Vice Chairman, and William S. Foster, Secretary. Others named to the control group are Dwight F. Metzler, as representative of the Sanitary Engineering Division, Ralph C. Graber, Alvin F. Meyer, Jr., and August T. Rossano, Jr. Active in the Council, in addition to the control group, will be representatives of the several organizations which are constructively concerned with aspects of the air resources conservation problem.

Planned for early accomplishment is an invitational seminar to give definition to the various studies which are to be undertaken. The Council has voted support for this proposal. As details are worked out, announcement of the scope, time and place will be made.

MOTOR VEHICLE POLLUTION CONTROL BOARD GOES INTO ACTION

The California Motor Vehicle Pollution Control Board has moved into an action program with a goal of approving at least two devices by the end of 1961.

A contract was approved, effective January 1, 1961, with the Los Angeles Air Pollution Control District for use of their automotive laboratory under supervision and control of the staff of the Board. Work has begun on establishing detailed test procedures for the first phase of testing exhaust emission control devices to see if they meet State Board of Public Health standards for emission of hydrocarbons and carbon monoxide. Because a complete technical staff has not yet been acquired, consultants are being retained on a load basis from cooperating industries.

Each of four automobile manufacturing companies--American Motors, Chrysler, Ford and General Motors--has assigned an engineer to work with the control board staff for a month, beginning mid-February. Standard Oil Company of California has also lent a member of their industrial hygiene staff to the board for a month to give technical advice in the field of industrial chemistry.

Procedures for receiving devices for testing are also under way. Application forms have been given to more than 70 individuals and firms which requested them. These forms must be submitted with complete test data as developed by the manufacturer to indicate compliance with the State Board of Public Health standards on hydrocarbons and carbon monoxide emissions from exhausts. Upon submission they will be screened by the staff of the Motor Vehicle Pollution Control Board. When the screening process is completed, the successful applicants will be required to submit 25 prototypes of their device for complete confirmation testing by the staff of the Motor Vehicle Pollution Control Board.

The testing procedures now being developed will be applied to the devices received, with most of the prototypes being installed on test fleets and others being submitted for laboratory tests. Basically, all tests will be for conformity to hydrocarbons and carbon monoxide standards. Information will also be obtained on other emissions and data will be accumulated for other criteria to be established such as cost, live, odor, noise, and safety of the device. The detailed test procedures are not yet fully developed, but the principles and types of testing have been established, so that the goal of certification during 1961 seems attainable.

The contract with the Los Angeles Air Pollution Control District Laboratory may be only the first of a series of contracts with public and private laboratories. Since more devices may be submitted than can be processed in the present board facilities, arrangements with other laboratories are being negotiated so that additional facilities may be available as the need arises.

The Motor Vehicle Pollution Control Board is confronted with the policy of whether it should approve control devices for crankcase emissions as well as exhaust emissions. Since standards for this type of emission were established by the State Board of Health in December of 1960, the Motor Vehicle Pollution Control Board has been obtaining information on blowby devices. American automobile manufacturers have already installed such devices on 1961 model new cars sold in California and one or more companies are now in mass production of these devices, so that much less difficulty is expected in testing and approval of blowby equipment if the board decides to proceed.

NUCLEAR ENERGY

AEC ISSUES REACTOR SITE SELECTION GUIDE

The AEC recently published new Guides for selecting reactor sites. The new criteria are the results of three years work and by concentrated effort of a special staff named last spring. The guide attempts to provide formulae for those factors in site selection that are quantitatively measurable, while listing the intangible factors that will also be considered in applying the formulae. Three measures for selecting the location of a reactor are defined: (1) exclusion area, (2) low-population zone, and (3) population distance. The first and latter are "classical measures;" the second is a new classification.

"Inherent characteristics and specifically designed safeguard features of the reactor. . . plus its purpose and method of operation," will be given special consideration. Another broad exception, i.e., "Even if a more serious accident (not normally considered credible) should occur, the number of people killed should not be catastrophic," will keep reactors out of big city areas even though the prescribed formulae may justify their positioning there.

Industry's reaction was mixed with some surprised by its reasonableness and some finding it too definite and arbitrary. A summary of estimates of reactor distances are given below:

Power (1 Mwth)	Excl. Dist. (mi)	Low Pop. Zone (mi)	Pop. Ctr. Dist. (mi)
1500	.70	13.3	17.7
1200	.60	11.5	15.3
1000	.53	10	13.3

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Power (1 Mwth) Cont'd	Excl. Dist. (mi) Cont'd	Low Pop. Zone (mi) Cont'd	Pop. Ctr. Dist. (mi) Cont'd
900	.50	9.4	12.5
800	.46	8.6	11.5
700	.42	8.0	10.7
600	.38	7.2	9.6
500	.33	6.3	8.4
400	.29	5.4	7.2
300	.24	4.5	6.0
200	.21	3.4	4.5
100	.18	2.2	2.9
50	.15	1.4	1.9
10	.08	.5	.7

BOARD REPORTS ON IDAHO REACTOR ACCIDENT

The recent SL-1 reactor accident at the National Reactor Testing Station in Idaho has triggered an AEC survey on current information regarding the performance of reactors and their safety practices and controls. This is a precautionary measure to avoid inadvertent criticality by obtaining a comprehensive current picture of specific aspects of reactor operations and to assure that necessary steps are taken during maintenance operations. This survey covers all reactors licensed by the AEC and asks for specific information as to nuclear characteristics and how they vary from characteristics shown on the license application.

The Board of Investigation, appointed by the AEC to determine facts about the SL-1 incident, issued a report on January 21, 1961. A summary of its findings are set forth below:

"A. An explosion occurred in the SL-1 reactor at approximately 9:00 p.m. on January 3, 1961, resulting in the death of three persons, damage to the reactor and to the reactor room, and in high radiation levels (approximately 500-1,000 r/hr) still present within the reactor room.

"B. Two members of the crew were killed instantly by the explosion. The third died within about two hours as a result of an injury to the head.

"C. The explosion involved a nuclear reaction. The thermal nvt (integrated neutron flux) above the reactor is currently estimated to have been approximately $10^{10} n/cm^2$.

"D. Chemical and radioactivity measurements on a single fragment of reactor fuel ejected by the explosion, if representative of the total fuel, suggest that the reaction may have resulted in 1.5×10^{18} fissions. This would have produced 50 megawatt-seconds of energy.

"E. At the time of the explosion, the reactor crew appears to have been engaged in the reassembly of control rod mechanisms and housings on top of the reactor. The pressure generated within the reactor, which may have reached several hundred pounds per square inch, was vented through a number of partially closed nozzles in the head of the reactor, blowing out shield plugs, portions of control rods, and some fuel.

"F. The explosive blast was generally upward from the ports in the top of the reactor. Structural damage to the building, principally due to objects projected from the nozzles, was slight. Damage to the reactor core cannot be determined at this time.

"G. Some gaseous fission products, including radioactive iodine, escaped to the atmosphere outside the building and were carried downwind in a narrow plume. Particulate fission material was largely confined to the reactor building, with slight radioactivity in the immediate vicinity of the building.

"H. At this time it is not possible to identify completely or with certainty the causes of the incident. The most likely immediate cause of the explosion appears to have been a nuclear excursion resulting from motion of the central control rod. As yet there is no evidence to support any of several other conceivable initiating mechanisms.

"I. It is known that a variety of conditions had developed in the reactor, some having their origin in the design of the reactor and others in the cumulative effects of reactor operation, which may be contributed to the cause and extent of the incident."

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MANUAL ON GROUND WATER BASIN MANAGEMENT

The Committee on Ground Water of the Irrigation and Drainage Division has completed the newest in the series of ASCE Manuals on Engineering Practice. This Manual (No. 40) is concerned with the operation and management of ground water resources for irrigation and other beneficial uses. The Manual will find its field of greatest use in the planning of water development projects and in designing and programming facilities for the controlled conjunctive operation of surface and ground water reservoirs in order to make maximum use of available water supplies. Copies of the ASCE Manual No. 40 can be obtained by use of the attached coupon. The list price is \$4.00, with ASCE members and public and school libraries receiving a 50% discount.

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ASCE MANUAL ON SEWAGE TREATMENT PLANT DESIGN

The result of several years of work by a joint committee of the Sanitary Engineering Division of ASCE and the Water Pollution Control Federation (formerly the Federation of Sewage and Industrial Wastes Associations) is available in a manual entitled "Sewage Treatment Plant Design." In this manual the joint committee has summarized and interpreted current practices in the design of sewage treatment plants. The committee does not attempt to approve or disapprove the practice, but merely reports what is being done.

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